

POLYFORCE – Polymers with and without reinforcements for part manufacturing through selective laser sintering

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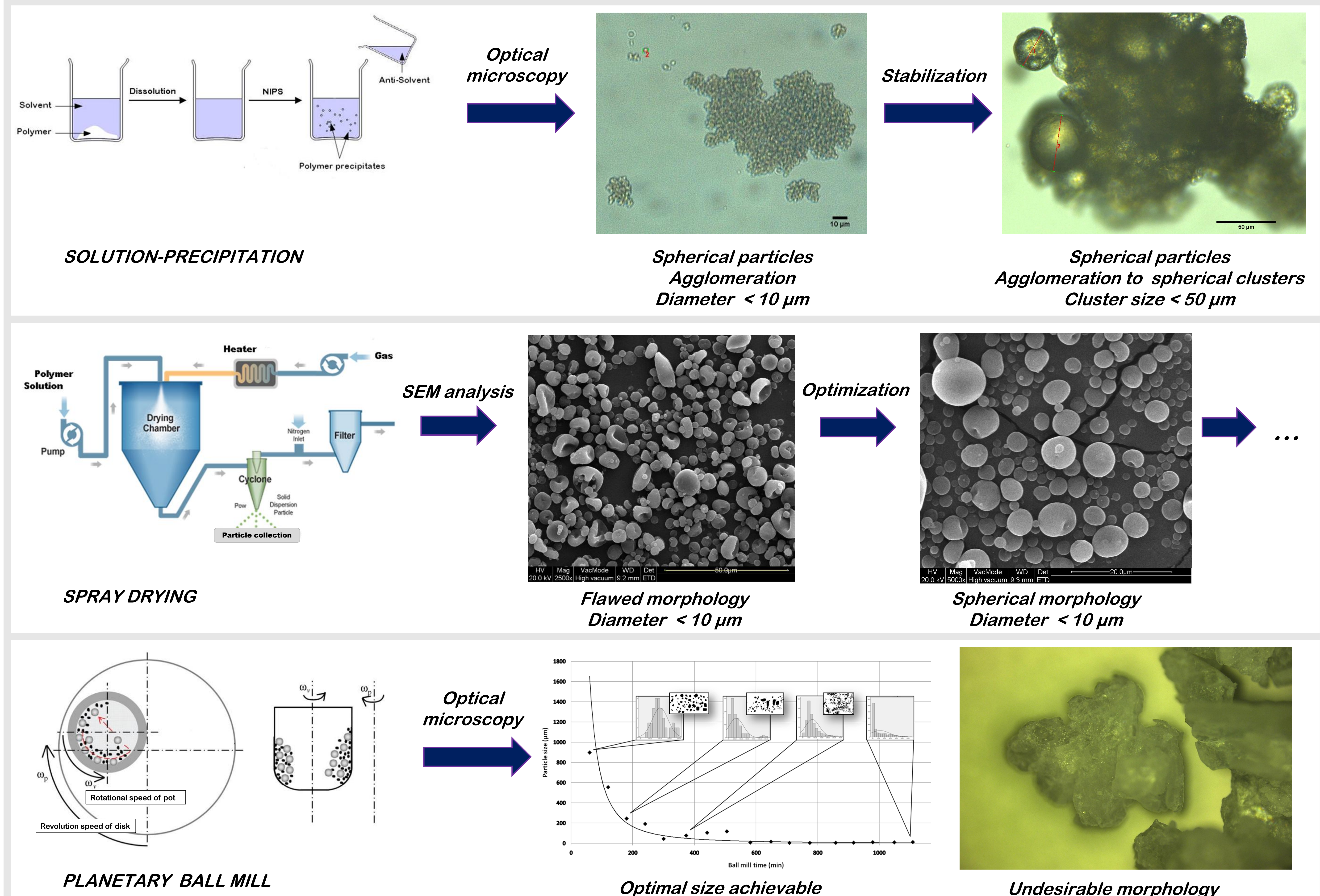
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Introduction

Selective Laser Sintering (SLS) is an **additive manufacturing** process that forms 3D objects by selectively fusing together successive layers of powdered material. The advantage of such processes is the ability to form parts with **significantly greater geometrical complexity** than can be done in more traditional processes. Although SLS is mostly known as a **rapid prototyping technique** it recently expanded its field to the production of actual **end-of-use parts**. A stumbling block in the progression of this technology is the limited range of materials that can be processed. With the current move towards the end-use products the mechanical properties of the produced parts become increasingly important and other materials need to be developed to broaden the application window. This research focuses on finding a general method to process possible polymers into a suitable form for SLS printing using both mechanical and physico-chemical approaches. It is our goal to produce in this way **small spherical particles** of about **50-90 μm** with a **good density**. Within the scope of processing techniques extra attention will be given to **spray drying** and **solution precipitation techniques** next to conventional **ball milling** as they are most likely to yield the desired particles.

Processing methods



Outlook

The main focus in this research lies on the optimization of the current existing processes to form the desired particles. Particles of desired morphology are already feasible yet size optimization is still ongoing. A theoretical correlation will be made between the mechanical and thermal properties and the used technique.